

A new occurrence of scheelite, molybdenite, powellite and gadolinite in Phalwadi-Positara area, District Sirohi, Rajasthan *

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Significant occurrences of scheelite, molybdenite, powellite and gadolinite in Erinpura granites and associated acid veins have been located in Phalwadi-Positara area, district Sirohi, Rajasthan.

In the course of regional geochemical reconnaissance, drainage anomaly for tungsten and tin was recorded in parts of the area in 1975. The present note is based on the follow up field study together with ultraviolet checking and geochemical sampling of selected geological units.

Quartz-sericite schists with thin intercalations of micaceous quartzite, andalusite-magnetite quartzite and calc-silicate rock belonging to the Delhi Supergroup forms a narrow NE-SW trending belt within the Erinpura granite. The contact zone is riddled with veins of micropegmatite and pegmatite. A few small, fine grained, younger granite bodies also occur in the area, showing unequivocal intrusive relationship with both the Erinpura granite and the schists.

Scheelite occurs as disseminated fine grains up to 3 mm in size. It is dull grey in colour and identified by its bright blue fluorescence under short-wave ultraviolet rays. Molybdenite occurs as small, flaky aggregates up to 1 cm × 0.5 cm in size. It is lead grey, soft with a metallic lustre. The X-ray powder diffraction identifies it as molybdenite—2H type with cell dimensions a 3.162 Å and c 12.28 Å. Powellite (cell dimension a 5.23 Å, c 11.43 Å) is present as an alteration product of molybdenite. It occurs as thin yellowish encrustations or powdery films around the molybdenite. It is better identified by its bright yellow fluorescence under ultraviolet light. The occurrence of gadolinite was first reported by Ramachandran and Bandopadhyay in 1975 (unpublished progress report G.S.I.) from a pegmatite vein in the northeastern part of the area. They described it as a metamict mineral containing 0.60% ThO₂ and 48.96% total rare earth oxides. It also contains little allanite. Gadolinite is also found to occur as fine to medium crystals in randomly oriented quartzo-feldspathic patches within a younger granite body. It commonly carries a brownish peripheral zone of alteration.

The significant mineralogical association and elemental distribution in the various lithic units near the contacts of Erinpura granite are :

1. Dark coloured, fine grained tourmaline-quartz stringers and small veins occupying joints in granite contain small patches of fluorite and disseminated fine grains of scheelite. Stains of malachite and limonite are also seen. The veins show average concentration of Sn 85 ppm, W 87 ppm, Mo 11 ppm and Cu 350 ppm.
2. Rare and small quartz veins intruding mainly the schist contain 30 ppm of Sn and 150 ppm of Bi. These are commonly associated with tourmaline, fluorite, ilmenite, arsenopyrite and limonite.

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3. Dissemination of scheelite is found in an elongated sheared zone (300m × 4m) in granite showing W content of 200 ppm. The shear zone is marked by silicification and chloritisation.
4. The calc-silicate rock in contact with granite contains a fair quantity of scheelite and the metallic concentration is of the order of 1500 ppm of W and 150 ppm of Sn.
5. Pegmatite veins (length 20 m to 100 m, width 25 cm to 2 m) commonly show tourmaline and occasionally lepidolite. The average content of W and Sn in them is 50 ppm and 20 ppm respectively. One tourmaline rich pegmatite showed strikingly high concentration of W (2500 ppm), Bi (370 ppm), Nb (550 ppm) and Sn (40 ppm). Gadolinite occurs in feldspar-rich pegmatite veins in the northeastern part of the area.
6. In micropegmatite veins and dykes the average concentration of W and Sn is 70 ppm and 11 ppm respectively. The randomly oriented coarser quartzo-feldspathic patches in them occasionally show dissemination of scheelite. Such patches show 500 ppm of W.
7. A fine grained granite body of 1.5 km in length and 400 m in average width, intruding the coarse grained Erinpura granite at Phalwadi carries molybdenite, powellite, scheelite and gadolinite, which are, however, concentrated within the randomly distributed coarse quartzo-feldspathic patches and along linear zones of silicification. There are also a few thin molybdenite and powellite bearing quartz veins intruding the granite. Encrustations of calcite and fluorite on joint planes of granite are common.

The mineral association along with the distribution of elements noted in the above geological set up indicates pegmatitic-pneumatolitic activity in this region, related to the younger granites.

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